

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method of generating an image of an object using a multimode imaging system configured to operate in a plurality of modes of operation including at least three modes, the multimode imaging system including a source assembly, a detector assembly, and a mechanical means for positioning the source assembly and the detector assembly, the source assembly attached to the mechanical means for positioning and including an x-ray source configured to emit x-ray signals, the detector assembly attached to the mechanical means for positioning and including a detector, said method comprising the steps of:

selecting a first mode of operation comprising a computed tomography volume mode;

positioning the source assembly and the detector assembly in a first position using the mechanical positioning means for the first mode of operation, wherein the source assembly and the detector assembly are attached to the mechanical positioning means and rotating the mechanical means for positioning about an angle of 180 degrees plus a fan angle while emitting x-rays from the x-ray source and collecting signals from the detector assembly in the first mode of operation;

selecting a second mode of operation;

positioning the source assembly and the detector assembly for the second mode of operation in a second position different from the first position using the mechanical positioning means, wherein the source assembly and the detector assembly are attached to the mechanical ~~positioning means;~~ and positioning means;

generating an image of the object for each determined mode of operation, wherein, for the first mode of operation, said generating an image includes using said collected signals from the detector assembly in the first mode of ~~operation.~~ operation; and

configuring the multimode imaging system to combine at least one image from the first mode of operation with at least one image from the second mode of operation to thereby improve image quality.

2. (Previously Presented) A method in accordance with Claim 1 wherein said selecting a second mode of operation comprises the step of selecting at least one of an x-ray fluoro mode and a tomosynthesis mode.

3. (original) A method in accordance with Claim 1 wherein positioning the source assembly and the detector assembly, said method comprises the step of rotating the detector assembly and the source assembly about the object.

4. (Currently Amended) An imaging system for generating an image of an object, said imaging system configured to operate in a plurality of modes of operation including at least three modes and comprising:

a source assembly comprising a movable x-ray source configured to emit x-ray signals;

a detector assembly comprising a movable detector;

a mechanical positioning means for positioning said source assembly and said detector assembly relative to the object, said source assembly movably attached to said mechanical positioning means and said detector assembly movably attached to said mechanical ~~positioning means;~~ and positioning means;

a controller enabling an operator to selectively operate said system in a plurality of modes comprising a computed tomography volume mode and generate an image of the object for each determined mode of operation, wherein in said computed tomography volume mode, said mechanical positioning means is configured to rotate an angle of 180 degrees plus a fan angle while emitting x-rays from the x-ray source and collecting signals from the detector assembly, and to generate said image in said computed tomography mode utilizing said ~~collected signals.~~ collected signals; and

said imaging system configurable to combine at least one image from a first mode of operation with at least one image from a second mode of operation to thereby increase image quality.

5. (Previously Presented) A system in accordance with Claim 4 wherein said plurality of modes further comprises at least one of an x-ray fluoro mode and a tomosynthesis mode.

6. (original) An imaging system in accordance with Claim 4 wherein said source is configured to move relative to said positioning means to alter a distance from said source to said detector.

7. (original) An imaging system in accordance with Claim 4 wherein said detector is configured to move relative to said positioning means to alter a distance from said detector to said source.

8. (original) An imaging system in accordance with Claim 4 wherein said source and said detector are aligned along a plane of interest, and wherein at least one of said source and said detector configured to move relative to other said assembly and said positioning means to alter said plane of interest.

9. (original) An imaging system in accordance with Claim 4 further comprising a table for supporting the object, said source and said detector are movable relative to said table.

10. (original) An imaging system in accordance with Claim 9 wherein said positioning means is movable relative to said table.

11. (original) An imaging system in accordance with Claim 4 wherein said detector comprises at least one detector panel.

12. (original) An imaging system in accordance with Claim 11 wherein at least one said detector panel is rotatable relative to said positioning means.

13. (original) An imaging system in accordance with Claim 11 wherein said detector comprises a first detector panel and a second detector panel.

14. (original) An imaging system in accordance with Claim 13 wherein said first detector panel is angularly positioned relative to said second detector panel.

15. (original) An imaging system in accordance with Claim 4 wherein said positioning means comprises a base and an arm movably coupled to said base.

16. (original) An imaging system in accordance with Claim 15 wherein said arm comprises a first end portion and a second end portion wherein said x-ray source assembly coupled to said arm first end portion, and wherein said detector assembly coupled to said arm second end portion.

17. (original) An imaging system in accordance with Claim 4 wherein said positioning means comprises a base and a gantry rotatably coupled to said base.

18. (Currently Amended) An imaging system for generating an image of an object, said imaging system comprising a base, a mechanical positioning means movably attached to said base, an x-ray source assembly comprising an x-ray source configured to emit x-ray signals and attached to said mechanical positioning means, and a detector assembly comprising a detector attached to said mechanical positioning means, said system configured to:

enable an operator to select a mode of operation from a plurality of modes of the imaging system, said plurality of modes including a computed tomography mode in which said mechanical positioning means rotates through an angle of 180 degrees plus a fan angle, said x-ray source emits x-rays and said detector assembly collects signals, and in which an image in said computed tomography mode is generated utilizing said collected signals;

alter the position of said detector assembly and said source assembly relative to said other assembly and the object based on the selected mode; and

generate an image of ~~the object.~~ the object; and

said system further configured to enable the operator to select at least one additional mode of operator from the plurality of modes of the imaging system and to combine images from the selected modes of operation to thereby improve image quality.

19. (Previously Presented) A system in accordance with Claim 18 wherein to enable the operator to select a mode, said system is configured enable the operator to select at least one of an x-ray fluoro mode and a tomosynthesis mode.

20. (original) A system in accordance with Claim 18 wherein to alter the position of said detector assembly and said source assembly, said system is configured to rotate said positioning means relative to said base so that said detector assembly and said source assembly are rotated about the object.

21. (original) A system in accordance with Claim 18 wherein to alter the position of said detector assembly and said source assembly, said system is configured to move at least one of said source and said detector relative to said other assembly to alter a distance between said source and said detector.

22. (original) A system in accordance with Claim 18 wherein said source and said detector are aligned along a plane of interest, and wherein to alter the position of said detector assembly and said source assembly, said system is configured to move at least one of said source and said detector relative to said other assembly to alter the plane of interest.

23. (original) A system in accordance with Claim 22 wherein to move at least one of said source and said detector relative to said other assembly, said system is configured to translate at least one of said source and said detector parallel to the plane of interest.

24. (original) A system in accordance with Claim 18 further comprising a table for supporting the object, and wherein to alter the position of said detector assembly and said source assembly, said system is configured to move said detector and said source relative to said table.

25. (original) A system in accordance with Claim 24 wherein to move said detector assembly and said source assembly relative to said table, said system is configured to rotate said detector assembly and said source assembly about said table.

26. (original) A system in accordance with Claim 18 wherein to generate an image of the object, said system is configured to radiate x-ray signals from said x-ray source toward said detector.

27. (original) A system in accordance with Claim 26 wherein to generate an image of the object, said system is further configured to collect image data.

28. (original) A system in accordance with Claim 27 wherein said detector assembly comprises at least one detector panel, and wherein to collect image data, said system is configured to detect x-ray signals utilizing a portion of at least one of said detector panel.

29. (original) A system in accordance with Claim 28 wherein to detect x-ray signals utilizing a portion of at least one of said detector panel, said system is configured to alter a position of at least one of said detector panel.

30. (original) A system in accordance with Claim 26 wherein said detector assembly comprises a first detector panel and a second detector panel, and wherein to collect image data, said system is configured to angularly position said first detector panel relative to said second detector panel.

31. (original) A system in accordance with Claim 30 wherein to angularly position said first detector panel relative to said second detector panel, said system is configured to position said first detector panel at an obtuse angle relative to said second detector panel.

32. (original) A system in accordance with Claim 30 wherein to angularly position said first detector panel relative to said second detector panel, said system is configured to position said first detector panel at an acute angle relative to said second detector panel.

33. (original) A system in accordance with Claim 30 wherein to angularly position said first detector panel relative to said second detector panel, said system is configured to position said first detector panel perpendicular to said second detector panel.

34. (original) A system in accordance with Claim 18 wherein said positioning means comprises an arm having a first end portion and a second end portion, wherein said x-ray source assembly coupled to said arm first end portion, and wherein said detector assembly coupled to said arm second end portion.

35. (original) A system in accordance with Claim 18 wherein said positioning means comprises a gantry rotatably coupled to said base.

36. (Currently Amended) A method of generating an image of an object using a multimode imaging system configured to operate in a plurality of modes of operation including at least three modes, the multimode imaging system including a source assembly including an x-ray source configured to emit x-ray signals, a detector assembly including a detector, and a means for positioning the source assembly and the detector assembly, said method comprising the steps of:

coupling the source assembly to the means for positioning;

coupling the detector assembly to the means for positioning;

selecting a first mode of operation from a plurality of modes including a computed tomography volume mode in which said positioning means rotates through an angle of 180 degrees plus a fan angle, said x-ray source emits x-rays and said detector assembly collects signals, and in which an image in said computed tomography mode is generated utilizing said collected signals;

positioning the source assembly and the detector assembly in a first position for the first mode of operation;

selecting a second mode of operation;

positioning the source assembly and the detector assembly for the second mode of operation in a second position different from the first ~~position; and position;~~

generating an image of the object for each ~~determined~~ selected mode of ~~operation.~~
operation; and

configuring the multimode imaging system to combine the generated images to thereby improve image quality.

37. (New) A method of generating an image of an object using a multimode imaging system configured to operate in a plurality of modes of operation, said method comprising the steps of:

generating an image of the object in a first mode of operation;

generating an image of the object in a second mode of operation; and

configuring the multimode imaging system to combine at least one image from the first mode of operation with at least one image from the second mode of operation to thereby improve image quality.

38 (New) A method in accordance with Claim 37 wherein the plurality of modes of operation comprise a plurality of modes selected from the group consisting of computed tomographic modes, X- ray fluoro mode, and tomosynthesis mode.

39. (New) A method in accordance with Claim 37 wherein at least one of the modes of operation includes an x-ray fluoro mode and another includes a 3-D image mode, and further comprising operating the imaging system in the 3-D image mode to locate a desired element and then operating the imaging system in the x-ray fluoro mode to predict or determine the trajectory of a medical instrument with respect to the desired element.

40. (New) An imaging system for generating an image of an object, said imaging system comprising a base, a mechanical positioning means movably attached to said base, an x-ray source assembly comprising an x-ray source configured to emit x-ray signals and attached to said mechanical positioning means, and a detector assembly comprising a detector attached to said mechanical positioning means, said system configurable by an operator to combine at least the first image and the second image from the selected modes of operation to thereby improve image quality.

41. (New) A method of generating an image of an object using a multimode imaging system configured to operate in a plurality of modes of operation, said method comprising operating the imaging system in a 3-D image mode to locate a desired element and

then operating the imaging system in an x-ray fluoro mode to predict or determine the trajectory of a medical instrument with respect to the desired element.